

# Math 2283 - Introduction to Logic

Quiz #7 - 2010.09.29

Solutions

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For the following questions, let  $K$  be an arbitrary class from a given universe of discourse  $V$ . Answer each question, and write at least one sentence to explain your answer.

1.  $K \cup V$

We have  $K \cup V = V$ , since the union (or sum) of  $K$  and  $V$  consists of all objects which are in  $K$  or in  $V$ . But everything is in  $V$ , therefore we do indeed arrive at  $K \cup V = V$ .

2.  $K \cap V$

We have  $K \cap V = K$ , since the intersection (or multiplication) of  $K$  and  $V$  consists of all objects which are both in  $K$  and  $V$ . But everything that is in  $K$  must also be in  $V$ , but there is nothing that is in  $V$  which is not in  $K$  that can be in the intersection. Therefore we have at  $K \cap V = K$ .

3.  $K \cup \Lambda$

$K \cup \Lambda = K$  since  $\Lambda$  is the null set, so the union of  $K$  with nothing results in  $K$ .

4.  $K \cap \Lambda$

$K \cap \Lambda = \Lambda$  since  $K$  and the set which contains nothing,  $\Lambda$ , have nothing in common, which gives  $K \cap \Lambda = \Lambda$ .

5.  $\Lambda'$

$\Lambda' = V$  since everything in  $V$  which is not nothing is  $V$  itself.

6.  $V'$

$V' = \Lambda$  since the set which has objects not in the universe of discourse  $V$  consists of no objects, which is the definition of  $\Lambda$ .